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20. Synthesis of Acetone from Acetylene.

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This study was performed to incrase the yield of acetone and to decrease the water to be reacted with.

As the chief catalyst Fe_2O_3 and ZnO were used, which had been found good for the catalytic conversion of acetaldehyde into acetone as reported in the 9th paper on this subject.

Experimental conditions:

volume of catalyst 30c.c., length of preheating furnace 10 cm, length of reaction furnace 30 cm.

Quantitative analysis of condensation products:

Total amount of acetone and aldehydes was measured by hydroxyramine hydrochloride, on the other hand aldehydes were oxidized by H_2SO_4 acidic 0.1N-$KMnO_4$ solution and acetone was estimated by Iodoform reaction of Messinger's method.

Experimental results:

Catalyst	Mol ratio	Reaction temp.	C_2H_2 Reaction rate (%)	Acetone yield (%)	Pass velocity of H_2O c.c./hr.	C_2H_2 s. v.
ZnO	—	450	36.2	15.1	27.5	191
Fe_2O_3	—	400	71.8	22.1	30.0	187
Fe_2O_3 : ZnO	1 : 4	450	59.8	11.2	30.0	239
〃	1 : 2	〃	57.2	19.9	35.0	189
〃	1 : 1	〃	55.4	20.7	35.0	189
〃	2 : 1	〃	44.6	32.7	30.0	189
〃	4 : 1	〃	45.6	24.3	32.5	192
Fe_2O_3 : $ZnCrO_4$	1 : 2	〃	63.7	61.6	30.0	191
〃	1 : 1	〃	61.4	68.1	30.0	190
〃	2 : 1	〃	66.4	71.6	30.0	191
〃	4 : 1	〃	74.6	58.2	25.0	189

Regardless of the mixed ratio of the catalysts, the yield of acetone was maximum when pass velocity of water was 30c.c./hr.

The s. v. and life of the mixed catalysts (Fe_2O_3 : $ZnCrO_4$=2 : 1) were studied under the condition which gave maximum yield of acetone, and it was found that, when s. v. of C_2H_2 was about 2001/hr., the results were the most favorable.

When steam was passed over catalysts at 300°C for 3 hours with the object of reactivation, the yield of acetone decreased independent of such treatment, while reaction rate of C_2H_2 increased.